

Levy on Bunkering vs. Emission Trading System LoB vs ETS

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The Puzzle.....

- There is a growing scientific argument that rising concentration of CO₂, resulting from burning of fossil fuel increases the warming of climate
- However, there is a growing statistical argument, that this not the case....

Studying a long range time series data do not support the argument about ..warming (makridakis and others...)

- Therefore, a puzzle is in place



The Frame of the Presentation??

The atmosphere is used as a dumping ground of CO₂ from the use of fossil fuel

CO₂ is a source of pollution

How do we cope with this??



The Scope of the Presentation

Is:

1. To identify the means and alternatives to cope with the issue
2. To evaluate them, and
3. To identify an efficient way to cope with this



Externality

The Diagnosis,

The atmosphere is a public good, and is used in a such a way,

that the cost of a user 'the polluter – CO2 producer' is 'transferred' to the other user 'the non polluter-CO2 producer.'

What is the price that the polluter pays to the non-polluter??

None!!!

Therefore an externality exists.



Who are the Polluters?? CO2 allocation



(by P Zachariadis)



Given the allocation of CO2.....

- Does the Shipping industry has to be penalized for its 2,5% CO2 emission???
- Given that.
 - 1) seaborne trade is the most efficient way of moving goods across continents
 - 2) market conditions, imposes cost cutting policies



Given that shipping has to be 'penalized'
(I have some serious concerns though..)

The purpose of our research is,

- To identify an efficient way of payment for the externality caused by the shipping industry



The Shipping Industry

To comprehend what shipping is, Let's try to compare our world

- Without shipping:

Our world will be poorer!! Concepts such as: globalization, international trade, and others, would be only as theoretical concepts in economic textbooks

- With shipping:

International trade exists.

Iron ore and other minerals, oil, gas, finished products etc., are shipped from the producers to the users

- Shipping: the most efficient way of transporting 90% of world trade



Propositions

Up to now, there are 4 main propositions to cope with the externality caused by the Shipping industry. These are:

MBI (Market Based Instruments)

1. A carbon based bunkers tax, known as Levy on Bunkering “**LoB**”
2. Cap and Trade, known as **ETS**
(Emission Trading System)



Non 'MBI'

- **EEDI** (Energy Efficiency Design index)

=

CO₂ emitted / Transport Design Capacity

Applies to new ships only

- **EEOI** (Energy Efficiency Operating index)

=

CO₂ emitted / Transport Design Capacity

Applies to ships in operation

- **SEEMP** (Ship Energy Efficiency Management Plan)
(operational measures to improve vessels' energy efficiency)

Applies to all ships



The Main Parameters of the Energy Indexes

Are:

1. Lighter ships, using less steel and
2. smaller engines
3. Lower speed

However issues of safety and actual reduction of CO2 are raised (since smaller engines needs to work intensively.)

Major supporters of the Energy Indexes are:

1. Japan and
2. Denmark

Note:

It is considered as a great opportunity for Japan to capture the 'lost' championship of shipbuilding



Cap and Trade

- **Cap:**

Defines the allowable amount of rights for CO2 emission in a given period

Every right allows the emission of one ton of CO2 into the atmosphere.

- **Trade:**

The rights are tradable, thus a market is established for trading.

- **ETS (Energy Trading System is created)**

The outcome of the trading is 'price' formulation.



Pros and cons of the Cap and Trade

- **Pros:**

A theoretical definition of the allowed amount of CO₂ emission in the atmosphere (**Quantity Certainty**)

Definition of a 'theoretical cap'

- **Against:**

Introduction of (**Price Uncertainty,**) since an uncertain outflow is introduced

Thus,

- 1) A new market is in place (CO₂ trading....)
- 2) The operating cost of running the vessel gets **more uncertain**
- 3) **The overall volatility** of a shipping investment **increases.**



Ships Classification based on GRT

(GRT = Gross Registered Tonnage)

GRT	Number of Ships
400	60.000
500	45.000
2.000	30.000
10.000	16.000



The Participants in the Cap and Trade scheme

Given that the Cap and Trade proposition applies to ships greater than GRT 10.000,

- **Means that the majority of the ship population remains outside the proposition.**
- **A Trade off is in place:**

Since any attempt to include more vessels but smaller, the administrative cost increases disproportionately.

Thus, many polluters (ships) will remain outside the proposed cap and trade scheme.



Taxation

It is well known that the Applied Economist's solution to the externalities, (misuse of a public good) is taxation, thus,

- the cost of 'production' increases (incorporating the social cost (the cost of externality, along with the private cost.)
- Therefore, the output is reduced



CO₂ Emission is an Externality

Most of the sea borne trade is based on energy from fossil fuel combustion, thus CO₂ is emitted.

- 1) Externality is in place
- 2) The economist's solution is **taxation**, known as **Levy** (LoB = Levy on Bunkering.)

Therefore, the cost of 'production' increases', thus
output is reduced



The System of CO₂ emission....

There is an immense need to comprehend that, the amount of CO₂ emission is 2 systems with 8 variables

System A: The Ship owner's perspective

- 1) Quantity of CO₂ emission
- 2) Speed
- 3) bunkering 'consumed' and
- 4) The amount of taxation paid



System B: The Charterer's Perspective

System B: The Charterer's perspective

- 1) Amount of Inventory Needed
- 2) Time Elapsed between consecutive shipments
- 3) (\$) Cost to Charterer
- 4) (\$) Cost to final user



Putting the 2 systems together.....

Allows us to comprehend that any attempt to manage the amount of CO₂ emission

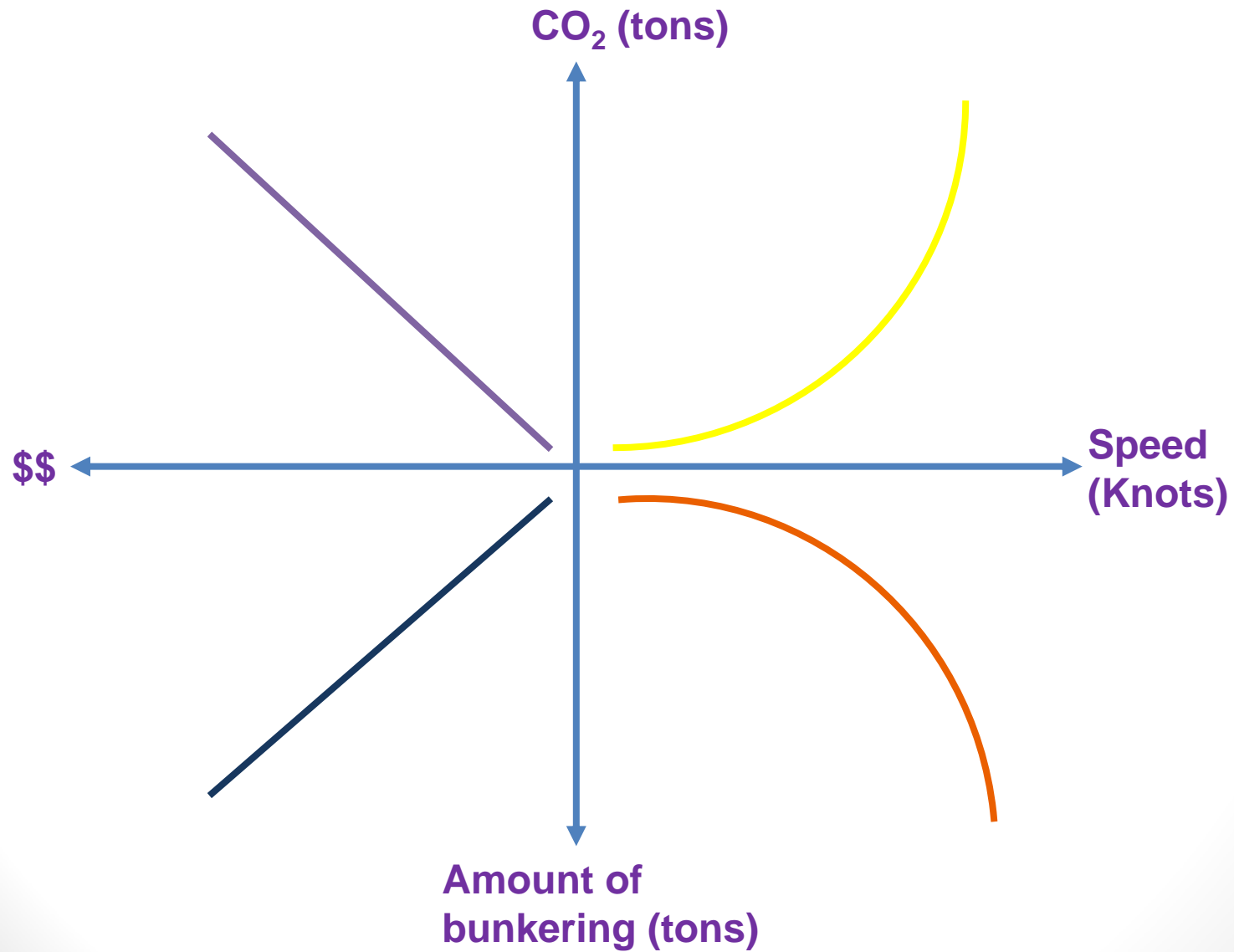
- is a business decision, and as such,

can not be evaluated outside the,

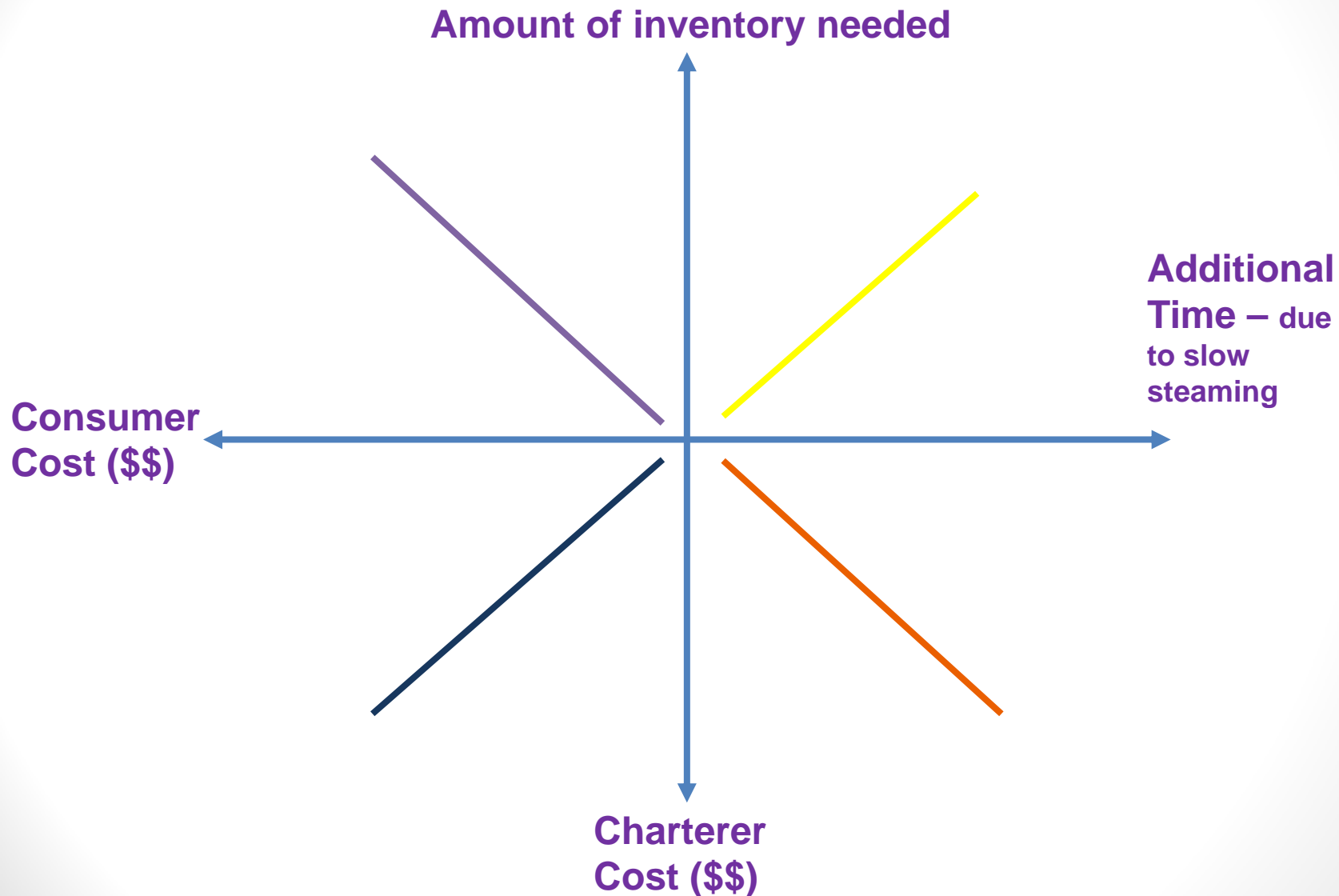
- Maritime Financial Management framework.



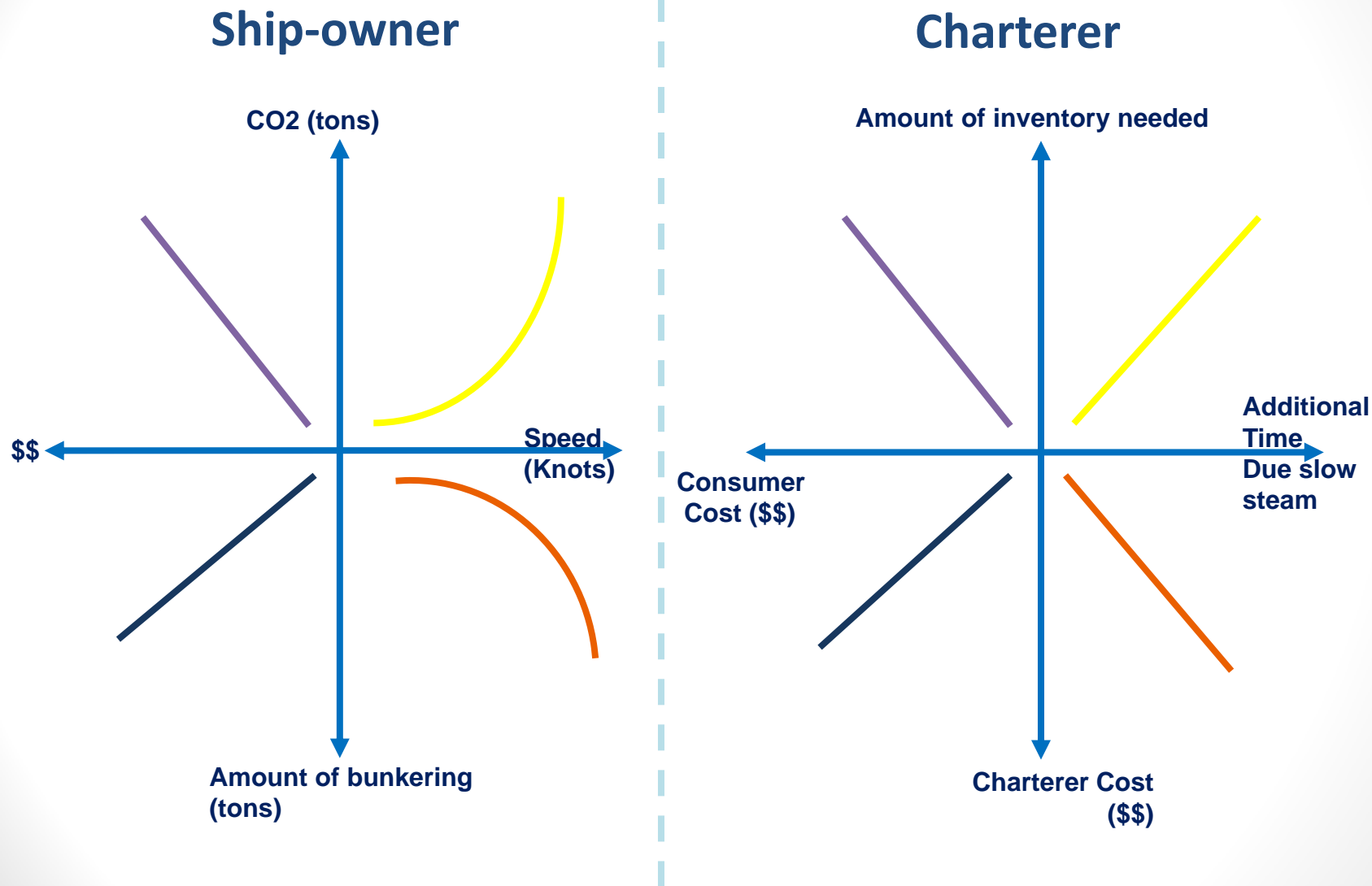
System A: The Ship-owner Perspective: (slow steaming)



System B: The Charterer's Perspective: (slow steaming)



An Integrated System of 8 Parameters



Indeed, the CO₂ Management

it is a business decision

and ...can not be evaluated outside the

MFM Frame

(Maritime Financial Management Frame)



Levy on Bunkering (LoB) vs ETS

Commonalities:

1. The use of fossil fuel for energy creation in seaborne transportation emits CO₂, thus creating externality
2. **Lob:** A penalty must be imposed – taxation
3. **ETS:** A penalty must imposed at a market price
4. **This ‘penalty’ takes the form of ‘operating outflow’**



The LoB Case....

A tax amount **L** is imposed

Indifferently of the size of the amount **L** (levy,)

it is an **outflow**, reducing the amount CF_n of the n^{th} period by,

a predetermined amount L.



The ETS Case....

A penalty **S**, is imposed

Indifferently of the S amount,

it is an **outflow**, reducing the amount CF_n of the n^{th} period by,

a stochastic amount S.



Under the ETS case...

we need to realize the fact that,

- indifferently if the cashflow stream is steady as in the case of operating the vessel under time period, and or variable as in the case of operating the vessel spot,
- **The volatility of the cashflows stream increases due to the stochastic nature of S_t .**



Identifying the consequences

The cashflow generating stream by operating the vessel under period, is

- Under the ETS frame, we have,

$$\Sigma PV(CF - S)$$

- Under the LoB frame, we have,

$$\Sigma PV(CF - L)$$



Comparing.....

The 2 streams of flow, we have,

$$\Sigma PV(CF - S) < \Sigma PV(CF - L)$$

This is due to the fact that,

Under the ETS frame: the volatility of the cashflow stream increases due to the stochastic nature of S.

Under the LoB frame: there is not incremental volatility , since the amount of penalty L is constant.



Managerial Consequences

	Cost of production	Managerial Choice	Risk	Risk management	Mana/ent cost	Speculation opportunity
LoB	Increases	There is not	No increment	No need	increases	There is not
ETS	increases	There is not	Increases	There is a need	Increases	exist



Conclusions

- 1) The management of CO2 emission affects the cashflow stream generating process.

Thus, evaluation cannot be done outside the **MFM** frame

- 2) The proposed **ETS method** for CO2 management 'Penalizes' the 'shipowner' **2ice**

- a) **Reduces the cashflow stream**
- b) **Increase volatility**



Conclusions

- 1) The proposed **LoB method** for CO2 management 'Penalizes' the 'shipowner' **once,**

Reduces the cashflow stream

- 2) The proposed ETS method for CO2 management has greater negative impact on valuation versus LoB method
- 3) The '**cost allocation**' should be determined inside the proposed system





Thank You

